

# Monroe Machine Service Bulletin No. 422

## MOTOR INFORMATION

Inspecting, Disassembling, Cleaning, Reassembling, Lubricating, Testing

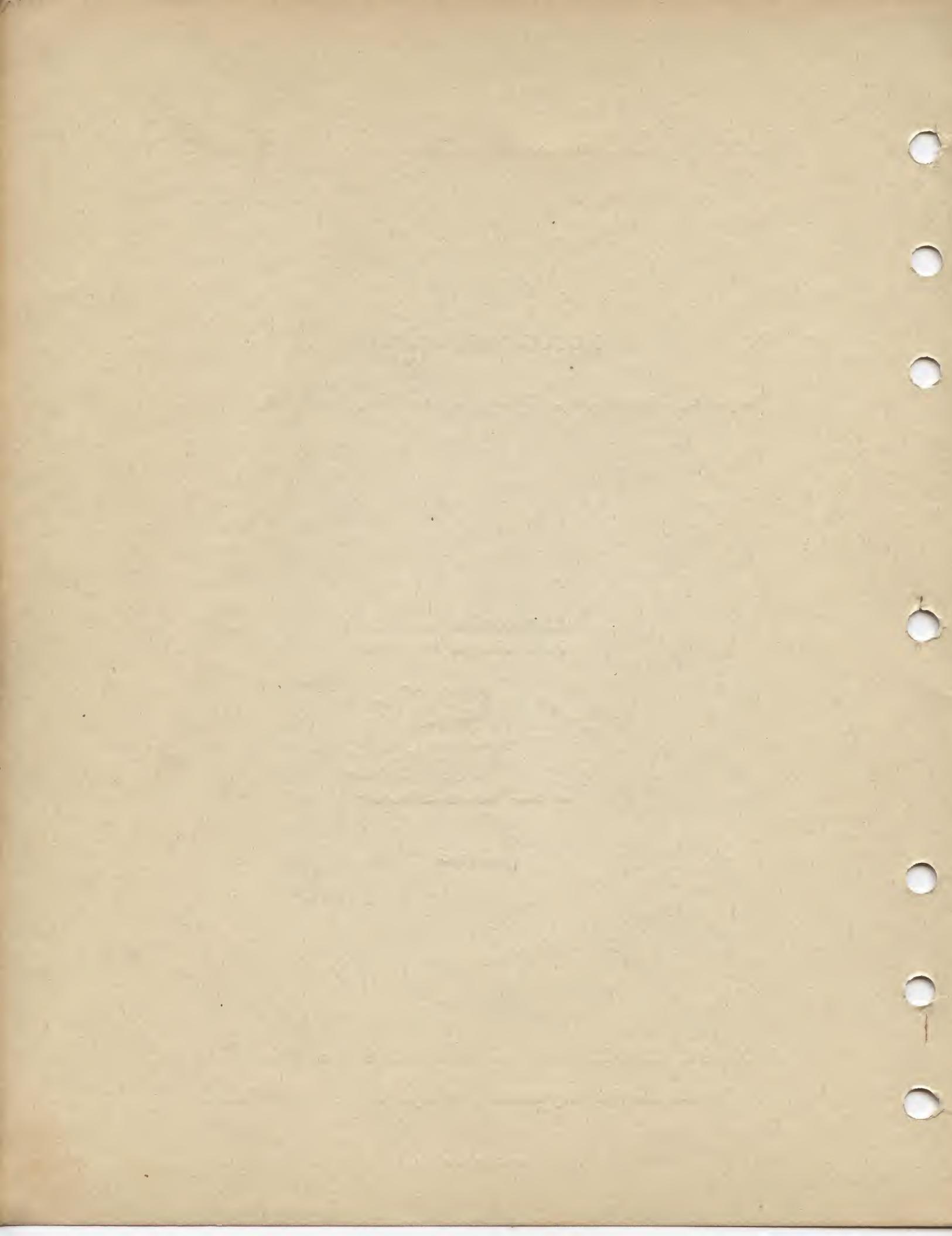
ALL MONROE MODELS  
USING SMALL MOTORS



April 1945

MONROE CALCULATING MACHINE COMPANY, INC.

General Service Department, Orange, New Jersey, U. S. A.



FOREWORD

The purpose of this bulletin is to acquaint servicemen with the necessity and means of properly servicing and cleaning small motors in all Monroe Adding Calculators, Listing and Bookkeeping Machines and Checkwriting Equipment. Although considerable instruction of this nature has previously been released in various forms and numerous Machine Service Bulletins dating back many years, the contents of this bulletin should sufficiently supplement such information as to eliminate all misunderstanding relative to motor maintenance. Listed as follows are many previously released Machine Service Bulletins containing motor data: #15, 36, 36A, 36B, 39, 47, 93, 94, 95C, 100, 100A, 100B, 100C, 101, 106, 127, 128, 186, 186A, 199, 199A, 199B, 199C, 199D, 205, 235, 241, 241A, 266, 276, 290, 293K, 298, 298A, 305, 325, 341, 344, 353, 353A, 389, 389A, 409, and 413.

NOTE: A combination Motor Reference Manual and Parts Catalog will be released in the near future covering all types of motors ever used in Monroe machines including wiring diagrams, data of governors, condensers, resistors and switches. Also, information on the construction of complete motor units and associated parts will be furnished. Other information such as oiling of motors, machine speeds, speed control, explanation of governor function, motor specification charts, motor hook-ups etc. will be contained in this one bulletin which will obsolete many previously released.

To Insure Proper Motor Operation

Motors require care in order to produce maximum power, maintain constant speed and function efficiently, economically and quietly. Neglect in properly servicing a motor will eventually reveal itself in overheated motors, short circuits, shocks, smoking, loss of driving energy and fluctuations in revolutions-per-minute.

At regular intervals, motors and associated parts should be carefully inspected for the following:

## 1 Governor

contact disc wear  
contact hinge wear  
contact point wear  
set screws loose

## 2 Speed Adjusting Screw

adjustment  
wear

## 3 Brushes

wear  
carbon dust  
dirt  
freedom  
proper installation

## 4 Brush Holders

carbon dust  
dirt  
loose holder

## 5 Brush Springs

distortion  
tension  
discoloration

## 6 Leads

loose connections  
wrong hook-up  
defective insulation

## 7 Armature

grounding  
carbon dust  
dirt  
dirty shims  
end play spacing

## 8 Frame

carbon dust  
dirt  
bushings dirty  
bushings worn

## 9 Field Coils

carbon dust  
dirt  
grounding

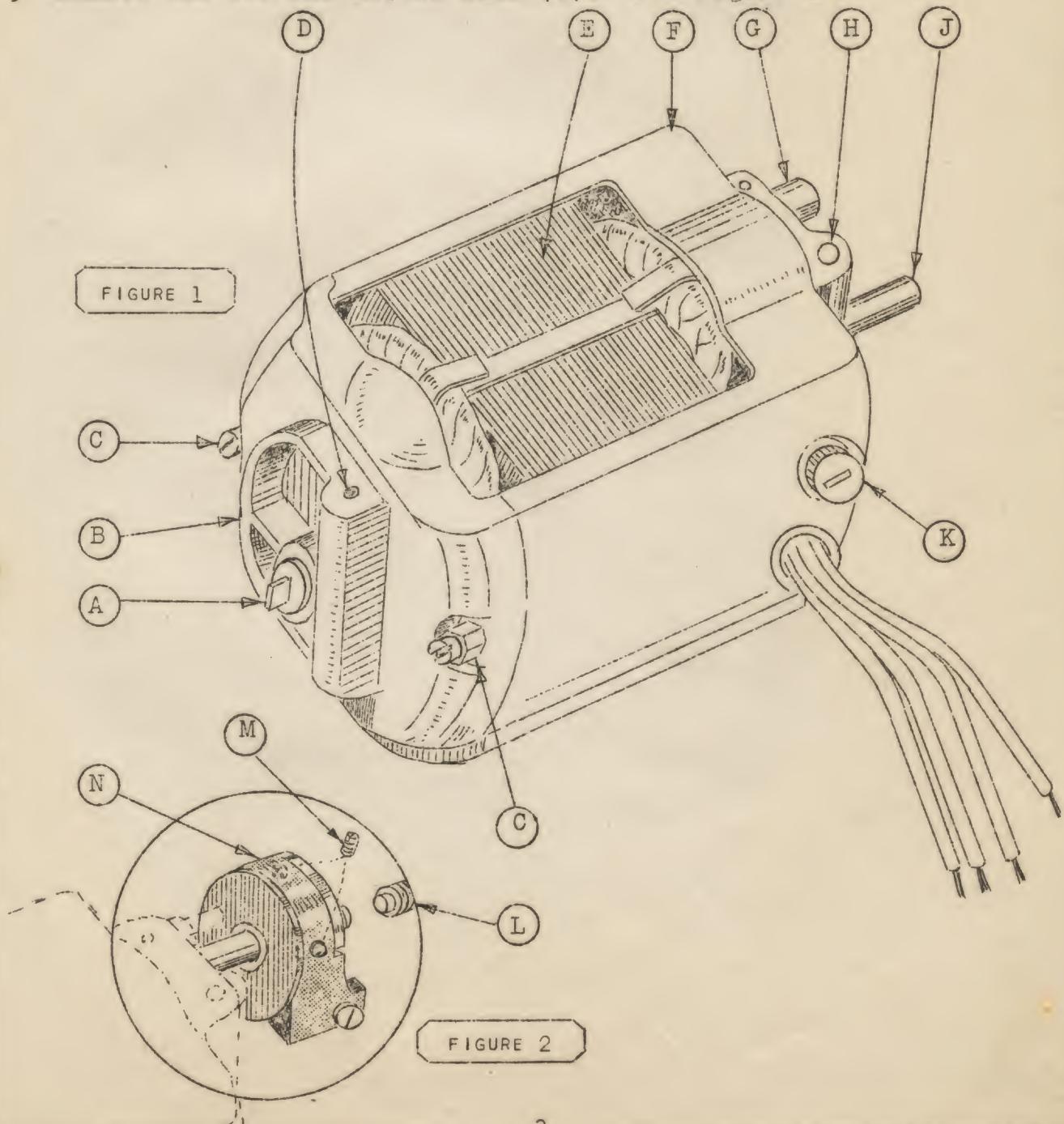
## 10 Commutator

carbon dust  
dirt  
wear

If A Motor Requires A Cleaning Proceed As Follows

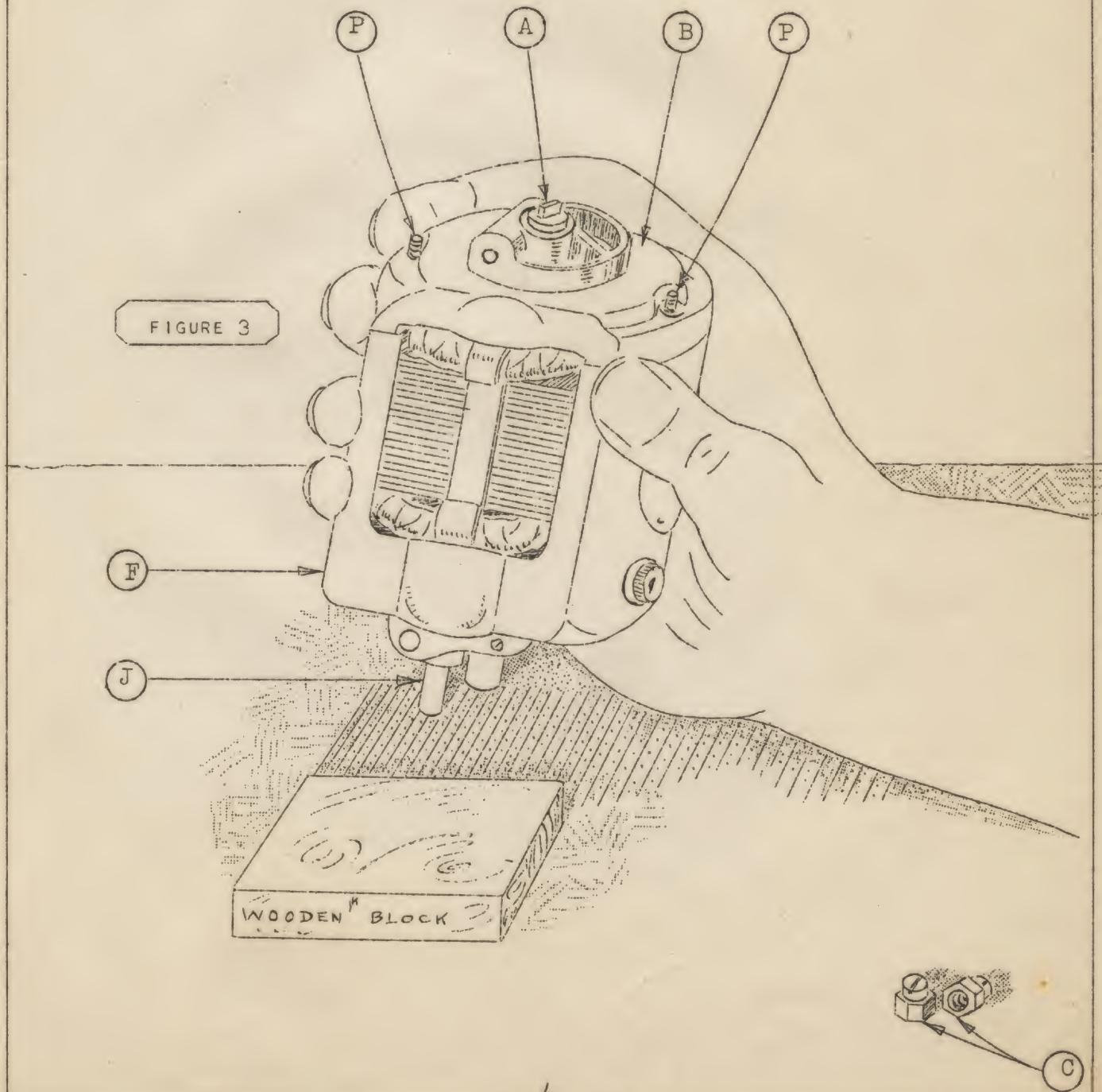
Disassembling

- 1 Remove the governor (N) by loosening its set screws (M) and backing out the speed adjusting screw (L). See Figure 2
- 2 Remove the three motor brushes (X), (A1), and (A3), figure 5. NOTE: The commutator brushes (X) and (A3) are set to the commutator (A6) and unless marked when removed, could be incorrectly inserted when reassembling. To avoid this, mark the top of the brushes as they are removed such as "T-NP" and "T" to identify their tops and the side of the motor from which removed. "T-NP" would signify "Top, Name Plate" side of motor.
- 3 Remove the two end shield nuts (C). See Figure 1



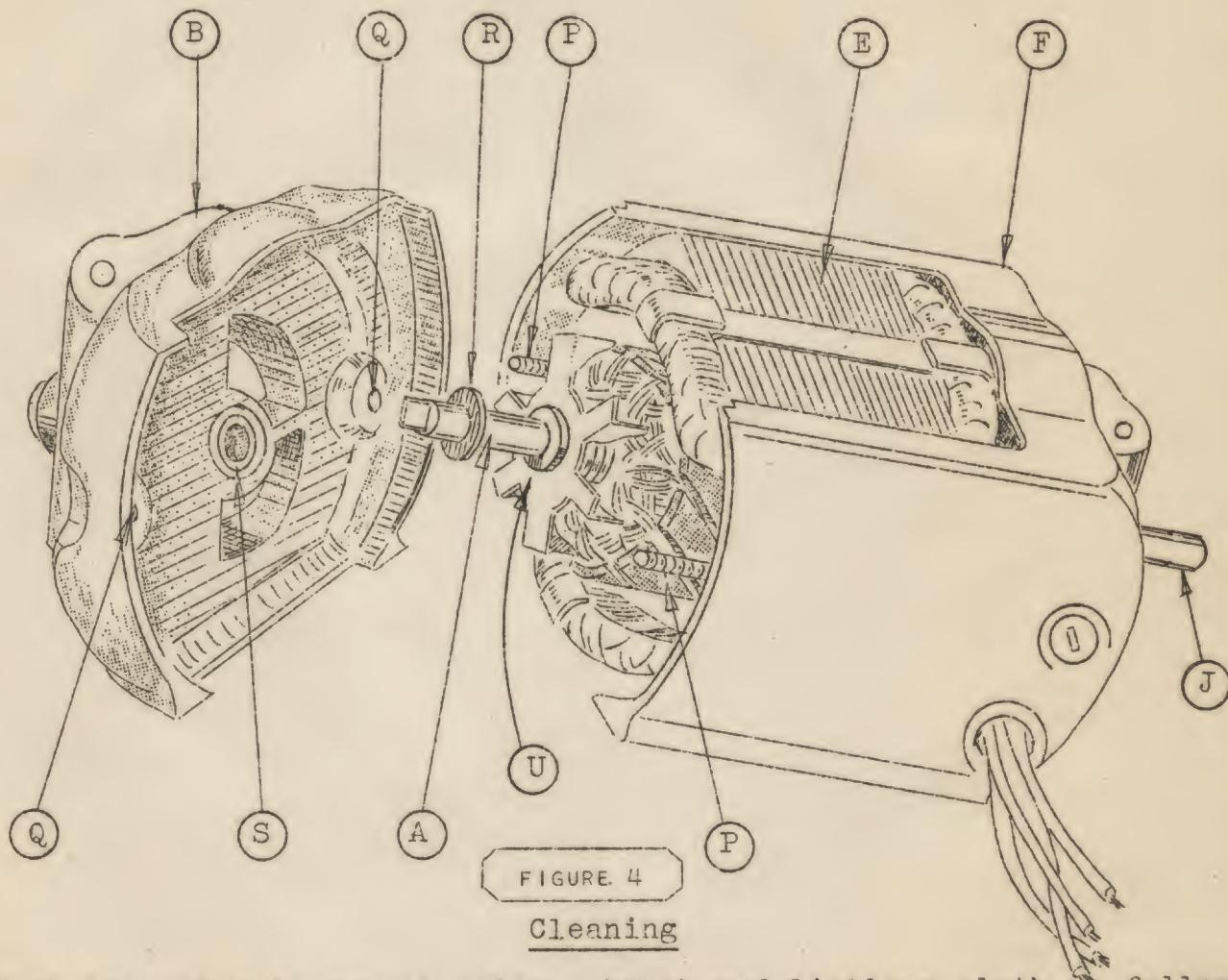
Disassembling (cont'd)

- 4 With motor held in hand as shown in Figure 3, tap the end of armature shaft (governor end (J)) on a block of wood to loosen the end shield (B) from the motor frame (F).



Disassembling (cont'd)

- 5 Remove end shield (B) and place aside after seeing that all armature shaft shims (R) are on ends (A) and (J) of the armature shaft and not sticking to end shield bushing (S).
- 6 Remove armature (U) from frame (F) of motor and note whether all shim washers (R) are in original positions on ends of armature shaft and not sticking to bushing of frame (F). The field coils (V) and stator (E), should be left in the frame (F).



Wash the motor in varsol using a brush and lintless cloth as follows:

- 1 Wash carbon dust away from commutator area (XX).

NOTE: The dark band on the commutator (A6) should not be removed. If the commutator is badly worn, the armature (U) should be replaced and the original returned to Orange for repairs. In an emergency a slight treatment of the commutator could be made with 8/0 sand paper or a grade finer. NEVER USE EMERY CLOTH, AS IT IS A CONDUCTOR AND WILL SHORT CIRCUIT THE MOTOR.

Cleaning (cont'd)

- 2 Wash and vigorously sweep away the carbon dust deposits from around the brush holders (Y) and (A5) on the inside of the frame. Let the frame dry naturally or dry with compressed air.
- 3 Wipe off the thrust faces (T) and ends of the armature shaft, wipe clean its shim washers (R). After cleaning, wipe shims with lintless cloth dampened in oil. (LEAVE NO EXCESS OIL).
- 4 Wash governor (N) if dirty.
- 5 Wash and vigorously sweep carbon dust deposits from outside of frame in vicinity of governor brush holder (G).
- 6 Wash the governor brush (A1) and commutator brushes (X) and (A3).
- 7 Moisten armature shaft with cloth dampened in oil before re-assembling.

Reassembling

- 1 Reassemble armature in frame and place end shield openings (Q) on bolts (P). Secure (B) to (F) with nuts (C). Replace all worn and distorted parts.

NOTE: Excessive wear of the bushing (S) of the end shield (B) indicates poor alignment of the motor with the machine transmission.

- 2 Determine that armature (U) turns freely with the maximum .007 end play before and after installing brushes (X) and (A3) with springs (W) and (A4).
- 3 Install brushes (X) and (A3) in correct positions in relation to commutator (A6). Note markings made on brushes when they were removed. Secure brushes in place with caps (K). Install brush (A1) with spring (Z) in holder (G). Install governor (N).
- 4 Carefully oil the bearings (S) and (A2) of the armature shaft with a very light drop of Monroe Oil, apply oil to oil wick openings (D) and (H) in end of frame and end shield.
- 5 See that all shims (R) are replaced in original locations on armature shaft.
- 6 Apply drop of porpoise oil to governor hinge pins.

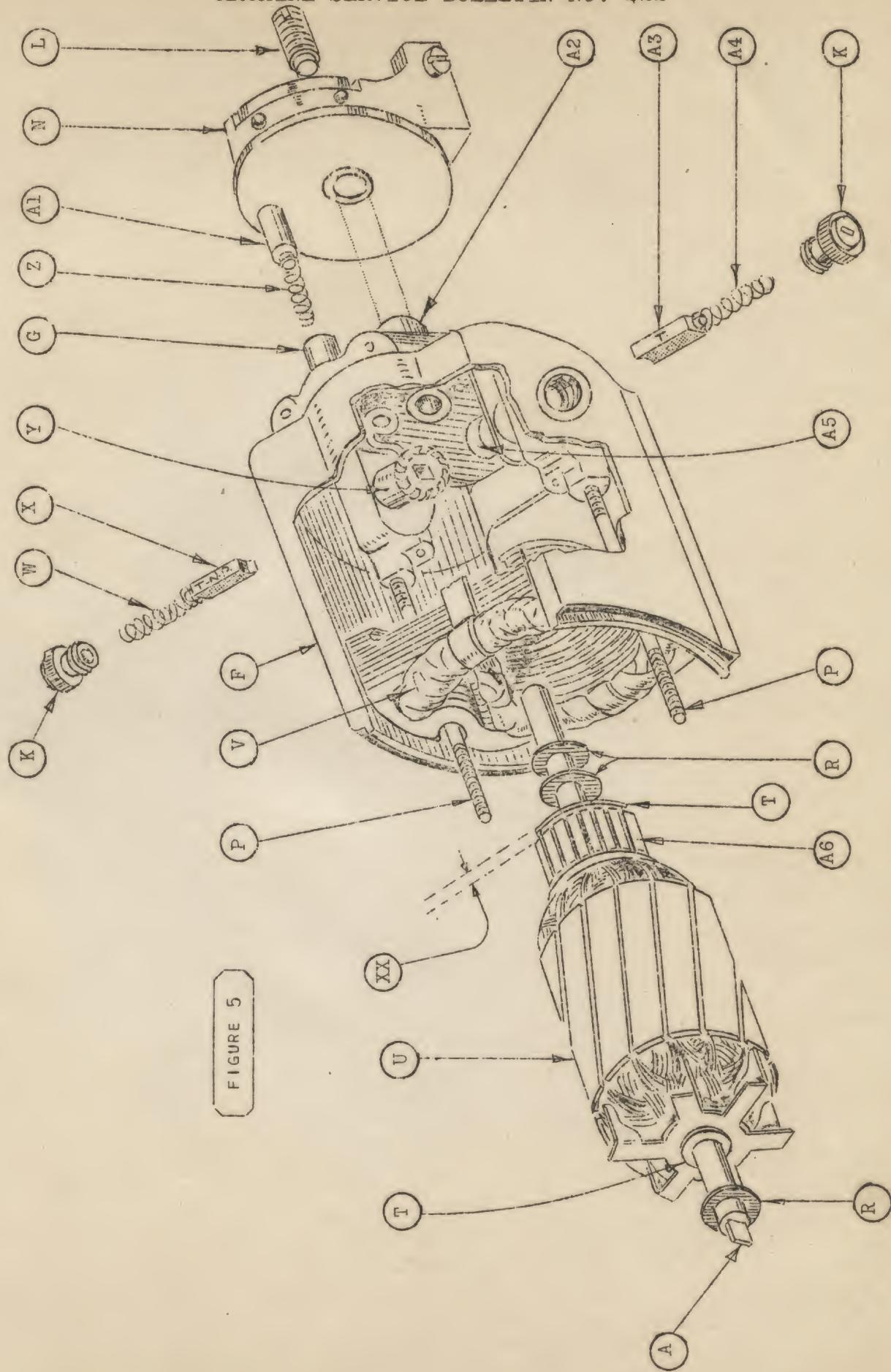
Testing

Assemble motor to its unit and insert in machine and adjust speed screw (L). Run the motor for  $\frac{1}{2}$  hour to determine if resetting of speed screw is required.

NOTE: When new commutator brushes (X) and (A3) are being "broken in", the speed will pick up and motor will increase power as the dwell of the brushes and the contour of the commutator assume correct relation to each other.

To test for grounds use 110 volt-25 watt bulb in line as shown in Figure 6.

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Device that can be used  
to test for grounds.

